

SUPPORT FOR THE AMENDMENT

This Amendment amends Claims 1, 6 and 14-18. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in Claim 4 and in the specification at least at page 9, lines 5-8 ("The hydroxyl group density is determined by the method published by J. Mathias and G. Wannemacher in *Journal of Colloid and Interface Science* 125 (1988) by reaction with lithium aluminium hydride"). A copy of *Journal of Colloid and Interface Science* 125 (1988) 61 ("Mathias/Wannemacher") is attached. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-18 will be pending in this application. Claim 1 is independent. Claims 6-18 are withdrawn from consideration pursuant to a Restriction Requirement.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention provides a silicon dioxide powder that can be incorporated into aqueous dispersions with high fill contents. Specification at page 2, lines 21-23. The silicon dioxide powder is produced by flame hydrolysis and displays a hydroxyl group density of 3 to 4.7 OH/nm². Specification at page 2, lines 29-32; page 4, lines 30-31. The hydroxyl group density is determined by reaction of the silicon dioxide powder with lithium aluminum hydride according to the method of Mathias/Wannemacher.

Claims 1 and 4-5 are rejected under 35 U.S.C. §102(b) over U.S. Patent No. 5,623,028 ("Fitzgerald"). Claims 2-3 are rejected under 35 U.S.C. §103(a) over Fitzgerald in view of U.S. Patent No. 6,328,944 ("Mangold-944") and U.S. Patent No. 6,423,331 ("Mangold-331").

Fitzgerald discloses that control of the surface silanol density in silica fillers used in formulating heat curable rubbers enables control of the percent sealing force retention of the composite. Fitzgerald at abstract. Fitzgerald discloses that fumed silica filler can have a surface silanol density of 4.5 OH groups/nm² (sic). Fitzgerald at column 11, lines 52-54. Fitzgerald discloses that the silanol density was determined by "nitrogenous base chemisorption" and/or "magic angle spinning solid state nmr". Fitzgerald at column 8, lines 24-25; column 9, lines 59-60). Thus, Fitzgerald implies that nitrogenous base chemisorption and magic angle spinning solid state nmr provide comparable results.

However, *Journal of Non-Crystalline Solids* 191 (1995) 29 ("Humbert") (copy attached) discloses at page 32, column 1, that the fumed silica Aerosil 200 appears to have significantly different hydroxyl concentrations when measured by thermogravimetry (3.8 +/- 0.2 OH/nm²) than when measured by nmr (17 +/- 2 OH/nm²).

Humbert's results show that Fitzgerald's silanol density of 4.5 OH/nm² measured using nmr is not reliable.

Mathias/Wannemacher shows that using the LiAlH₄ test method the total SiOH/nm² for Aerosil 200 is 1.8 after three days and 2.65 after being one year in storage.

Mathias/Wannemacher at page 67, Table II.

Because the hydroxyl concentration of Aerosil 200 measured by Mathias/Wannemacher using the LiAlH₄ test method is much lower than the hydroxyl concentration of Aerosil 200 measured by Humbert using nmr, Fitzgerald's silanol density of 4.5 OH/nm² measured using nmr would be much lower [e.g., 0.7 OH/nm² = (4.5)(2.65/17)] if measured by the method of Mathias/Wannemacher using LiAlH₄.

Thus, Fitzgerald fails to disclose or suggest the independent Claim 1 limitations of "silicon dioxide powder, produced by flame hydrolysis, and displaying a hydroxyl group density of **3 to 4.7 OH/nm²**, wherein the hydroxyl group density is determined by reaction of the silicon dioxide powder with lithium aluminum hydride according to the method of J. Mathias and G. Wannemacher in Journal of Colloid and Interface Science 125 (1988) 61". As a result, the rejection under 35 U.S.C. §102(b) over Fitzgerald should be withdrawn.

In controlling the surface silanol density in silica fillers used in formulating heat curable rubbers, Fitzgerald discloses "**reducing** the surface concentration of hydroxyl or silanol group on the silica surface ... is critical". Fitzgerald at column 5, lines 44-45.

Thus, Fitzgerald teaches away from and fails to suggest **increasing** hydroxyl group density as is achieved by the present invention.

The reduction in hydroxyl density in Fitzgerald is achieved by reacting an untreated fumed silica with a reagent that can undergo a reaction with the hydroxyl groups of the fumed silica yielding a fumed silica with an organically modified surface. In contrast, the surface of the silica according to the present invention is not bearing organic compounds.

Mangold-944 and Mangold-331 fail to remedy the deficiencies of Fitzgerald. The Office Action cites Mangold-944 and Mangold-331 against dependent Claims 2-3 for disclosing doped silicon powder.

Because the cited prior art fails to suggest all the limitations of independent Claim 1, the prior art rejections should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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Attached:

Journal of Colloid and Interface Science 125 (1988) 61 ("Mathias/Wannemacher")
Journal of Non-Crystalline Solids 191 (1995) 29 ("Humbert")